

## Introduction

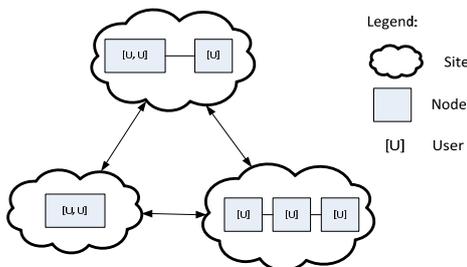
Conference XP, Access Grid, WebEx and Google Wave are some examples of real-time collaboration technologies. They each assist users to communicate and interact over the Internet, helping information sharing and decision making process.

However, these systems only serves general purpose. They also do not cater for a mixed-presence multimedia collaboration scenario. The attributes contributing to these lacks are:

- **Rigid functionalities:** Tools provided are rigid and cannot be modified, removed or added.
- **Complicated session set up:** Requires lots of user intervention when setting up a conference session.
- **Lack of medium/content support:** Depending on collaboration scenario, different contents are shared. The medium to transport these contents are not necessarily supported.

## New "Bit-Torrent" Style Conference

The "BitTorrent" style conference merely requires the conference creator to create a conference file. This conference file contains the initial address of the participating nodes. This file is then distributed to participants via any communication means such as e-mails and web sites. As the file is downloaded, participants only need to open the file to start the conference. The conference will begin by contacting the participating nodes listed in the file. As long as one of node is discovered, the entire collaborating cloud will be discovered. In the event if the participating nodes address in the torrent files changes from time to time, a more permanent node should be put in the list. Once all nodes are connected, participants can commence collaboration by launching the required services.



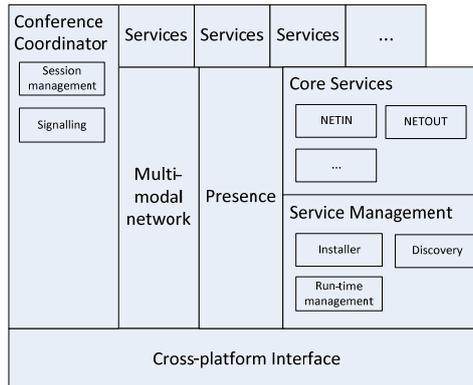
Each site can have one or more participants, forming an "inter-group". Connections between groups of sites are called "intra-group". Therefore, collaboration groups are separated by the following categories:

- **Nodes:** Denotes a machine or device. Each node can have one or more users.
- **Users:** Denotes individual participant of the collaboration.

- **Sites:** Denotes a collaboration site located within the same physical location. Each site can have one or more nodes.

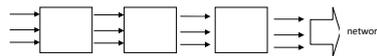
## The Advanced Remote Collaboration Framework

### The Architecture



- **Cross-platform:** The framework can run on any operating system and possibly even include embedded devices.
- **Multimodal network:** A network interface that can create connections catering to different traffic requirements.
- **Service management:** Services are dynamically discovered, acquired automatically if a copy does not exist, and loaded on all sites.

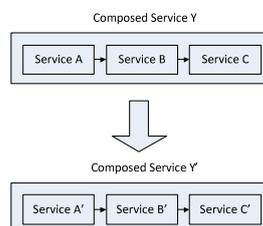
### Services



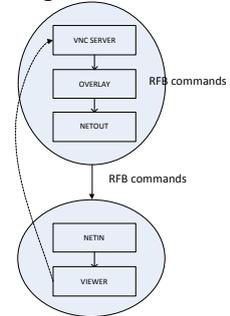
One way of achieving flexible workflow is to augment a service's functionality for serving individual's purpose. This is possible through the use of service-oriented principle where services can be reused and connected differently for a different outcome. It:

- **Encourages reuse of services.**
- **Increase the vocabulary base of a system.**
- **Exploit/Share remote resources.**

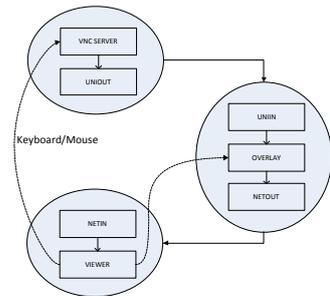
In ARCG, services is connected like a pipeline. Each module serves different purpose and can be connected to achieve desired functionality. A unit of connected services is called a "composed service". This is illustrated as below.



## Example Usage



A VNC server can be extended as with overlay functionality with an overlay module added. This overlay module can also be "offloaded" to another node for exploitation of remote computing resources. This is shown in the figure below.

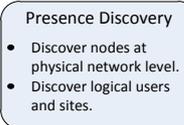


## Coordination of Conference

Conference coordination refers to the organisation amongst nodes in order to provide services for all participants to use. The coordination of service launch can be done in two methods:

- New collaboration session.
- Late-join into existing session.

In both cases, symmetric service assurance is provided by ensuring the trigger of one service result in the launching of the required components in other nodes in order to connect to this service. These are dictated by policies implemented.



## Conclusion

The ARCG framework provides the new "BitTorrent" style conference. It provides the mechanisms and protocols to perform presence discovery, service discovery and following by the coordination and maintenance of a conference session.

